



Room ACs with Star Ratings

An energy-efficiency labelling scheme from the Bureau of Energy Efficiency

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Meet India's Energy-Efficiency Labelling Scheme

Three hundred and eleven industrial establishments in India saved Rs. 989 crore in energy costs in the year 2004-05. The sale of CFL lamps in India also saw a rise from 18 million in 2002, to 57 million in 2005. These figures alone were enough to make everybody sit up and take notice when the Bureau of Energy Efficiency launched India's first energy efficiency label for tubelights and frost-free refrigerators on 18th May, 2006 in Delhi.

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All over the world, the first criterion for aware consumers while purchasing an electric appliance is its energy performance. An appliance that saves on energy will give you back its money's worth within its lifetime, whereas an energy guzzler will cost you many times more than the original price of the product, within the same period. For long running products like air conditioners, refrigerators, televisions and ceiling fans, an energy label thus becomes especially necessary.

What Will the Bureau of Energy Efficiency Do?

Bureau of Energy Efficiency (BEE) being an autonomous body, under the Ministry of Power, is now directed to define the energy stan-

dards for energy consuming products, the list of which is growing everyday. The BEE labelling programme is aimed at spreading consumer awareness. It plans to launch a massive consumer awareness campaign to inform consumers about the label's features and the potential impact of selecting energy efficient products for the household. BEE will work with consumer organisations and other agencies to test and check the validity of the BEE label on a regular basis. If the labels are found to carry incorrect information, the manufacturers will be held liable.

Room ACs Guzzle Power

In any home, air conditioners consume approximately 60 to 65% of the total energy required for the entire space. Table 1 gives the power consumption pattern in a typical 2-bedroom apartment.

While the selection of air con-

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	2-Bed Room Apartment			
	Nos.	Watts	Hrs. of Working	Unit / Day
Lamps	5	200	6	1.2
Tube-Lights	5	300	6	1.8
Fans	2	120	18	1.0
Refrigerator	1	400	12(*)	4.8
Miscellaneous	1	120	8	1.0
Air Conditioner (AC)	2	3800	5(*)	19.0
			TOTAL	29.8 (Say 30.0)

Table 1 : Typical residential load

AC Load : 63% at 10 hrs./day working; Refrigerator : 16% at 24 hrs./day working; (*) 50% Duty Cycle

ditioners for commercial applications is generally decided by competent consultants or engineers, who can study the performance claims of different brands and then conclude on the best buy, home owners are left to fend for themselves. They tend to get influenced by advertisements, appearances, brand image, product cost and various claims by manufacturers such as “fastest cooling”, “power-saving compressor”, “blue-fin technology” etc.

It therefore becomes essential to develop an unbiased guidance system for such consumers. Most countries

International Comparison						
China						
Category	Rated Cooling CC W	Energy Efficiency Grade				
		5	4	3	2	1
single-package		2.30	2.50	2.70	2.90	3.10
split	CC ≤ 4500	2.60	2.80	3.00	3.20	3.40
	4500 < CC ≤ 7100	2.50	2.70	2.90	3.10	3.30
	7100 < CC ≤ 14000	2.40	2.60	2.80	3.00	3.20

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Table 2: Rating Standards adopted by China

International Comparison		
US and Canada		
window	2.87	
central	3.37	(based on SEER 13)
South Korea		
window		2.88
split	CC < 4000W	3.37
	4000 - 10,000W	2.97
	10,000 - 17,500	2.76

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Table 3: Rating Standards adopted by US, Canada & South Korea

International Comparison			
Singapore			
window			2.73
Japan			
window		Heat pump	AC-only
		2.85	2.67
split		Heat Pump	AC-only
	CC < 2500W	5.27	3.64
	2500-3200W	4.90	3.64
	3200-4000W	3.65	3.08
	4000-7100W	3.17	2.91
	> 7100W	3.10	2.81

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Table 4: Rating Standards adopted by Singapore & Japan

International Comparison							
European Union							
	G	F	E	D	C	B	A
window	<2	2	2.2	2.4	2.6	2.8	>3
split	<2.2	2.2	2.4	2.6	2.8	3	>3.2

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Table 5: Rating Standards adopted by European Union

across the world have adopted rating programmes, whereby a buyer can make a choice. These programmes usually classify products in the market, with Numerical Ratings of 1 to 5 or Star Ratings of 1 to 5, which are made mandatory by legislation, have a mechanism for verification, and have authority to levy penalties and compel the producers to withdraw the products from the market. Tables 2, 3, 4 and 5 give rating standards adopted by China, US, Canada, South Korea, Singapore, Japan and European Union. The most stringent standards have been established by Japan.

The Scene in India

A fair estimate of the population of single phase air conditioners operating in India today will be around 5 million units. With industry growing at 25%, by the year 2010, the total population in India will go upto around 21.5 million units. These units will require 12,000 MW of electric energy in the current year, and around 45,000 MW of electric energy in the year 2010. If we can improve the energy efficiency of room ACs by 5%, we can save approximately 2,100 MW, which is equivalent to two large size power plants.

In early 2004, the Bureau Of Energy Efficiency formed a team, comprising of leading manufacturers in India, and asked them to propose a rating criteria. A series of meetings have been held in the last one year, and there has been active participation by the manufacturers in arriving at a consensus on the rating programme.

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Star Rating	Proposed Star Rating		
	From Jan. '07	From Jan. '08	From Jan. 2010
1 Star	2.30 to 2.49	2.50 to 2.69	2.70 to 2.89
2 Star	2.50 to 2.69	2.70 to 2.89	2.90 to 3.09
3 Star	2.70 to 2.89	2.90 to 3.09	3.10 to 3.29
4 Star	2.90 to 3.09	3.10 to 3.29	3.30 to 3.49
5 Star	Above 3.10	Above 3.30	Above 3.50

Table 6 : Star rating proposal details.

1. The COP should be calculated on the basis of cooling capacity in Watts divided by power input in Watts.
2. The testing of cooling capacity and power consumption are to be carried out as per IS 1391.
3. Range for star rating takes care of 5 % tolerance limit.
4. Same range is proposed for Window & Split AC.
5. Max operating test could also be carried out.

The Rating Programme

India will adopt 1 to 5 Stars as the Rating Programme (see Table 6). 1 Star will signify the least efficient product, and 5 Star, the best. A label has been developed, which will indicate the rating of the unit, and which will be displayed on the unit at an appropriate location, to enable the buyer to make a judgement of the performance. The individual Star Ratings will have a band-width for energy efficiency, and as of today, the majority of products will fall in Category 2 and Category 3. The bar will be raised on 1st January 2008, and 1st January 2010. The aim is to have one of the most stringent rating programme in the world, by the year 2010. The declaration of conformity to a particular Star Rating is left to the manufacturer, which can either be based on the test results in the laboratory of the manufacturer or at *Intertec*, Delhi, an independent and accredited testing facility.

Implementation Plan

In the present scope, wall and window mounted units upto 3 ton capacity, with fixed speed, single phase compressors, are covered. 3-phase systems, heat pumps, multi-split units and variable speed compressors will be considered at a later stage.

It is felt that about a year will be required to stabilise the programme. The details of the programme will be announced sometime in October '06. The programme will come in effect from 1st January 2007. Manufacturers will be given six months time to voluntarily adopt the programme. After a tentative period of six months, the programme will be made mandatory, and no product can be introduced in the market, without a Star Rating.

BEE will develop a verification system and will pick up random samples from the market, and test them independently at *Intertec*, or any other accredited industrial laboratory. If found to be wrong, the manufacturer will be told to change the ratings in the initial stage. Once the programme gets stabilised, the verification and penalty procedures will be made stringent.

The revenue generated from the charges for providing the label will be utilised by BEE in promoting and implementing the Star Rating Programme. It is expected that by mid-year 2007, the programme will stabilise.

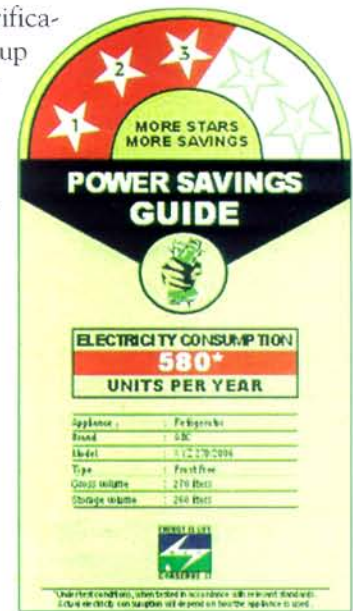
Design & Cost Implications

In general, some units will have to be redesigned to improve the performance. This can be achieved by increasing the condenser size, improving the efficiency of motors, improving the heat transfer efficiency of heat exchanger tubes, changing the configuration of fins and so on.

All this will have an impact on the material cost and a rough estimate is that costs may rise between 5 to 8% which may be partially or fully passed on to the customer. However this increase can be recovered by the customer in a short period. As an example, an AC of 1.5 ton capacity consumes around nine units of power for a 10-hour working day, for which the monthly electricity bill will be approximately Rs.1500. If 10% power can be saved due to improvements in performance, the additional initial cost of approximately Rs. 2000 can be recovered within 12 to 15 months. Thereafter the customer benefits for the entire product cycle.

Benefits

Both the consumers and the manufacturers will be benefited through this program. Consumers will be able to take better decisions in selecting a unit, while the manufacturers will have a common platform, on which the products will be judged by the consumers. With the bar getting raised on the efficiency levels, there will be a technological competition, and all products will tend to get upgraded. From the national perspective, there will be a substantial energy savings in the long run. ❖



The new energy efficiency label